REMARKS ON AN INTRODUCED SPECIES OF LAND-PLANARIAN APPARENTLY *BIPALIUM KEWENSE*, MOSELEY.

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In 1878 Mr. Moseley described a species of Land-Planarian *(Bipalium Kewense)* from a specimen found in one of the hot-houses at Kew Gardens(1). Recently Professor Bell has recorded his observations on another specimen, apparently of the same species, found among broken flower-pots in a garden in Sussex; he also gives a number of good figures of the animal (2).

The same species, seemingly, has become acclimatised in Sydney and its environs, and, probably finding the climate more like that of its native habitat, instead of appearing in occasional ones or twos it has increased so abundantly that, during the warm rains of the last few weeks, numbers made their appearance in gardens, on verandahs, and even on the public footpaths, in quite a remarkable manner. During the last five weeks I have myself seen about thirty specimens, and I have heard of quite as many others.

As in the case of the English specimens so with Sydney ones, nothing is known of their original habitat, or of the exact circumstances under which they came into the country, but there can be little doubt that they have been brought with foreign plants to gardens and nurseries, whence they have afterwards strayed, or have been distributed. There can also be little doubt that here the species has become thoroughly well-established, but whether Sydney gardens have been stocked from Kew Gardens, or *vice versa*, or whether both have been directly stocked from the original habitat, it is needless to speculate, since as in the case

(1) Ann. and Mag. Nat. Hist. Vol. I, ser. 5, 1878, p. 238.
(2) P. Z. S. 1886, p. 166, pl. 18.

of the nursery referred to below, for example, plants have been brought here from, and sent hence to, many parts of the world for the last fifty years or more.

Dr. Ramsay informs me that he remembers their being found under pieces of wood, &c., in the Australian Museum grounds, and at Dobroyde, as far back as 1874. In the Macleay Museum there are specimens of this, and of another possibly introduced species, found by Mr. Masters some years ago in Mr. Macleay's hothouse. But individuals appear never to have been so conspicuously numerous as they have been during April and May of this year.

Last February Mr. Masters kindly allowed me to examine a number of specimens of various worms collected, in the course of about six weeks, at one of the Sydney nurseries by Mr. James, in response to a request for worms of any sort. As illustrating the way in which the nurseries become possible foci for the distribution of certain introduced animals, it is worth while recording the contents of the bottle, as follows: four examples of planarians belonging to two indigenous species; seventeen specimens of introduced planarians belonging to two species, among which were eleven specimens of *B. Kewense;* together with a large number of earthworms belonging to three species all introduced. Of one introduced species of planarian, and of two of the introduced species of earthworms, the only other examples besides these which I have seen were from the Hon. William Macleay's garden, to which also plants have been brought from many parts of the world.

As I was working at earthworms at the time, the planarians were put aside for further examination, when my attention was again drawn to them by quite unexpectedly finding a very fine specimen of the *Bipalium* crawling on my doorstep on the evening of April 14th. After this I began to keep a look out, and subsequently on each of three different occasions within a few feet of the same spot I found another example (1). In the meantime I had begun to notice their slimy tracks, as well as injured or dead

(1) During the fortnight after the reading of this note I found three other living specimens on different evenings in the same situation.

specimens on the public asphalt footpaths at Stanmore. Shortly after Mr. Whitelegge told me that he too had noticed them on the footpaths at Surry Hills and in Hyde Park, and in the Australian Museum grounds. After this on several occasions I noticed examples on the paths in the Park, and also in Darlinghurst Road ; in the latter locality Mr. Masters also one morning counted six specimens dead on the footpath. On again comparing notes with Mr. Whitelegge he told me that on rolling over a cask in the Museum grounds he found twelve specimens, and that on another occasion Mr. Ogilby had found six under a piece of wood. Mr. Haswell also found specimens in the University Grounds ; and quite recently I have received one found under a piece of wood at Marrickville.

That these planarians should have appeared almost simultaneously in so many places is probably due to the same cause, but it is not clear whether this was merely a desire to obtain drier quarters, or whether the damp warm weather had tempted them forth in search of each other for reproductive purposes, this possibly being with them, as it certainly is with indigenous planarians, about the time of the breeding season. A small species of slug was very abundant about the same time in similar situations.

The specimens I saw in Hyde Park had evidently strayed from the enclosure about Capt. Cook's statue, which has been stocked with plants from the Botanic Gardens, where *B. Kewense* has doubtless obtained a footing. Those I saw elsewhere were, with few exceptions, in the vicinity of gardens, but in one or two cases they must have travelled considerable distances.

Their appearance on the pavements in the mornings in a moribund or dried-up condition—and all that I saw on the asphalt footpaths were in one or other of these states—may have been due to some injurious effect arising from contact with the asphalt, or the planarians may simply have wandered on until they were lost, and injured either by chilling due to the radiation of heat from the pavement towards morning, or by their exposure to the sunlight after dawn.

In respect of size some of our specimens are as large, if not larger than Professor Moseley's example, which was 9 inches long. I measured a living one, which, when extended, was 14 inches long. Eleven spirit specimens from the nursery referred to were from 4·2 to 12 cm. long and from 3-5 mm. broad anteriorly, diminishing posteriorly by about 1 mm.

In regard to colour, Sydney specimens agree with those examined by Professors Moseley and Bell in having the same number and arrangement of longitudinal bands, &c., but I notice in different living examples, and usually in different portions of the same animal, a considerable variation in the intensity of the colouring, as well as in the width of some of the stripes. Usually the stripes are uniformly darker and more intensely coloured in the anterior half or third of the body, and may frequently be described as black. The median stripe is sometimes a very fine line ; at other times, even in the same animal, it becomes as wide as the first lateral band on each side. Further back, all the bands may uniformly become paler and dimmer, and assume a brownish tint, or the median and outer lateral bands may be conspicuously darker, while the inner bands fade to a darker shade of the ground colour or are hardly perceptible. In a young living specimen (46 mm. long and 2 mm. broad when extended) the outermost bands vanished altogether in the posterior region of the body. In one case the ground colour between the median and first lateral stripe on each side was of a conspicuously darker colour.

The anterior margin of the cheese-cutter-shaped head when the animal is crawling sends off inferiorly, sensory, papilla-like prolongations with which it touches the surface on which it is crawling, just as Humbert and Moseley describe in other species. In his remarks Professor Bell points out that, when the animal is in a state of torpid quiescence, the head is contracted and obtusely pointed, and he insists rather emphatically on this variation from the cheese-cutter form of the head which characterises the genus *Bipalium*. I have recently had the opportunity of examining a large number of land-planarians belonging to some twenty

species and four or possibly five genera, including a number of spirit specimens of *Bipalium kewense*, and it seems to me that the variability in the form of the head is hardly likely to be of such a misleading character as might be inferred from the Professor's remarks.

In the specimens I have seen, though the body does taper gradually posteriorly, the attenuation is hardly so conspicuous as in Professor Bell's figures, or as mentioned in Professor Moseley's description.

I have not noticed the oral and generative apertures in living specimens, nor the latter even in spirit specimens in which the almost always everted, folded pharynx forms a conspicuous rosette-like structure situated at about one-third, or a little more, of the animal's length behind the anterior extremity. In two examples taken at random measuring 12 cm. and 9·3 cm., respectively, the oral apertures were 4·2 c.m. and 3·6 cm. respectively from the anterior extremities.

The almost white ambulacral line on the under side of the body bordered on each side by an almost black stripe, is very conspicuous; the relatively long and strong cilia on either side of the ambulacral ridge are readily seen when the under surface of a young specimen in an inverted watchglass is viewed under the microscope; elsewhere the cilia are more difficult to make out.

The first living specimen I obtained was placed in a glass jar with damp rotten wood, on April 15th. In a day or two I noticed that it had begun to divide transversely into fragments from about $\frac{1}{4}$ inch to 2 inches long, which were to be seen coiled round on the pieces of wood, or on the sides of the jar. A second specimen was put into the jar on April 29th.

I kept the jar under observation from day to day, and on May 25th I turned out its contents, when I found five fragments of varying lengths with developing cheese-cutter-shaped extremities, two portions without any indication of them, the remains of several portions which had died, together with the larger portion of the second specimen which had lost the anterior portion of its body; this however was readily distinguishable from the

fragments which were developing new heads by its larger cheese-cutter-shaped portion, its more intensely pigmented upper surface, and the two black patches just behind the head formed by the fusion of the most anterior portions of the lateral stripes. The anterior portion of the first specimen was wanting, and was probably one of the dead portions. Thus such of the fragments as had not too recently separated, had acquired fairly well-developed new cheese-cutter-shaped heads in about thirty days; whether in each case a new mouth and genital orifice had also formed was not apparent. A third specimen kept for several weeks maintained its bodily integrity.